	Application No.	Applicant(s)
Notice of Allowability	10/644,327	GAO, LI
	Examiner	Art Unit
	Victor J. Taylor	2863	$\mathcal{A}^{\mathcal{V}}$

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *6 July 2004*.

2. ☒ The allowed claim(s) is/are *12-41*.

3. ☒ The drawings filed on *24 February 2004* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some*   c) ☐ None   of the:

       1. ☐ Certified copies of the priority documents have been received.

       2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

       3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

        1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____ .

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of

        Paper No./Mail Date _____ .

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
    Paper No./Mail Date *8*

4. ☐ Examiner's Comment Regarding Requirement for Deposit
    of Biological Material

5. ☐ Notice of Informal Patent Application (PTO-152)

6. ☐ Interview Summary (PTO-413),
    Paper No./Mail Date _____ .

7. ☐ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

DETAILED ACTION

Drawings

1.   The drawings were received on 2/24/2004. These drawings are approved.

Information Disclosure Statement

2.   The information disclosure statement (IDS) submitted on 20 August 2003 was

entered after the mailing date of the office action on 17 June 2004 and consequently

was not before the examiner during the previous examination. The submission of this

IDS is in compliance with the provisions of 37 CFR 1.97 and was timely. Accordingly,

the examiner is considering the information disclosure statement during this office

action. The examiner wishes to thank the attorney for submitting the additional copies of

the missing previous submitted publications as cited in this document.

Response to Arguments

3.   Applicant's arguments, citing the missing documents associated with the instant

application including the IDS and the original preliminary amendment as filed 20 August

2003 with respect to the response of 7 July 2004 with the duplicate preliminary

amendment and entered on 7 July 2004 have been fully considered and are persuasive.

This preliminary amendment was not entered in the instant application when the

application was before the examiner. The rejection of 17 June 2004 has been

withdrawn. The examiner wishes to thank the attorney for clearly pointing this out in the

response to the office action.

4.   Applicant's arguments see the response to the office action of 17 June 2004 and
filed 06 July 2004, with respect to the new claims 12- 41 and the cancelled claims of 1-
11 have been fully considered and are persuasive. The statutory double patenting
under 35 U. S. C 101 on 17 June 2004 is Moot and has been withdrawn.

Prior Art

5.   The prior art made of record and not relied upon is considered pertinent to
applicant;

I. Art A Kriegshauser et al., US 6,466,872 in class 702/007 is cited for the method
of determination of apparent resistivity of anisotropic reservoirs using steps to apply
shoulder corrections to measurements from a multi-component electromagnetic logging
tool with computer processing for the anisotropic resistivity model using corrected data
with process iterated until a good match is obtained between the corrected data and the
model output using the logging tool in figure 2 the process steps in figure 4 to obtain
shoulder bed corrections in lines 5-65 of column 3 and column 4.

II. Art B of Chunduru et al., US 6,344,746 in class 324/339 is cited for the method
and computer modeling of time lapse measurements of resistivity data acquired at
different epochs using different types of wellbore tools to process raw induction logging
data with steps of processing earth models using the inversion process to determine
bed boundaries and layers using the processes steps in figure 3 to determine the model
parameters in line 7 of column 6 and teaches solving the minimization process using
linear equations and teaches steps using the Jacobian matrix to correspond to
measurements made at the first epoch in the upper portion and with the lower portion of

the Jacobian matrix corresponding to measurements made at the second epoch in the

computation of there model in lines 50 and 5-65 of column 6.

Allowable Subject Matter

6.   Claims 12-41 are allowed.

7.   The following is an examiner's statement of reasons for allowance:

The amendments of record presented with the arguments of record on 17 June

2004 by the applicant in the instant application convinces the examiner that the

application is allowable over the cited art of record.

I. The system in claim 12 for determining a formation profile surrounding a

wellbore with computer steps operable for "receiving field log data for a formation

surrounding a wellbore"...[and] with the steps of "generating a Jacobian matrix

responsive to the field log data" "...[and] with the steps of "the computer operable to

solve for a new formation conductivity profile using the Jacobian matrix"...[and] with the

steps to "calculate a new log response using the formation conductivity profile"...[and]

with the steps to "determine the log response converges with the received field log

data"...[and] with the steps of "performing a quasi-Newton update of the Jacobian

matrix and repeating the steps of operation for steps c to e if the log response does not

converge with the received field log data...and/or in combination with "outputting the

formation profile based upon the log response if the log response converges with the

received field log data" is not found in the cited art of record.

The prior Art A of Kriegshauser et al., US 6,466,872 teaches the method of

determination of the apparent resistivity of anisotropic reservoirs using steps to apply

shoulder corrections to the measurements from a multi-component electromagnetic logging tool, and teaches using computer processing for the anisotropic resistivity model and teaches using the corrected data with process steps in the model iterated until a good match is obtained between the corrected data and the model output and teaches using the logging tool in figure 2 with the process steps in figure 4 to obtain the shoulder bed corrections in lines 5-65 of column 3 and column 4.

The prior Art B of Chunduru et al., teaches computer modeling of the time lapse measurements of the resistivity data acquired at different epochs and teaches using different types of wellbore tools to process the raw induction logging data teaches steps for processing the earth models and teaches steps for using the inversion process to determine the bed boundaries and layers by using the processes steps in figure 3 and teaches step of computer instruction used to determine the model parameters in line 7 of column 6 and further teaches steps used for solving the minimization process with steps of using the linear equations. He further teaches steps of using the Jacobian matrix processed to correspond to the measurements made at the first epoch in the upper portion and with the lower portion of the Jacobian matrix corresponding to the measurements made at the second epoch in the computation of there model in lines 50 and 5-65 of column 6.

Therefore, the prior art Kriegshauser et al., and The prior art of Chunduru et al., in combination or alone does not teach the present limitation of the claimed combination limitation.

It is these limitations expressed in each of these claims and not found, taught, or suggested in the prior art of record, that makes these claims allowable over the prior art.

Claims 13-17 which are dependent on the allowed independent claim 12 are allowed at least for the reasons cited above.

II. The system in claim 18 for determining a formation profile surrounding a wellbore The machine readable medium article of manufacture in claim 18 with the storage medium storing instructions operable to cause one or more machines to perform processing operations with computer steps operable for "receiving field log data for a formation surrounding a wellbore"…[and] with the steps of "generating a Jacobian matrix responsive to the field log data" "…[and] with the steps of the computer operable for "solving for a new formation conductivity profile using the Jacobian matrix"…[and] with the steps to "calculate a new log response using the formation conductivity profile"…[and] with the steps to "determine the log response converges with the received field log data"…[and] with the steps of "performing a quasi-Newton update of the Jacobian matrix and repeating the steps of operation for steps c to e if the log response does not converge with the received field log data…and/or in combination with "outputting the formation profile based upon the log response if the log response converges with the received field log data" is not found in the cited art of record.

The prior Art A of Kriegshauser et al., US 6,466,872 teaches the method of determination of the apparent resistivity of anisotropic reservoirs using steps to apply shoulder corrections to the measurements from a multi-component electromagnetic logging tool, and teaches using computer processing for the anisotropic resistivity model

and teaches using the corrected data with process steps in the model iterated until a good match is obtained between the corrected data and the model output and teaches using the logging tool in figure 2 with the process steps in figure 4 to obtain the shoulder bed corrections in lines 5-65 of column 3 and column 4.

The prior Art B of Chunduru et al., teaches computer modeling of the time lapse measurements of the resistivity data acquired at different epochs and teaches using different types of wellbore tools to process the raw induction logging data teaches steps for processing the earth models and teaches steps for using the inversion process to determine the bed boundaries and layers by using the processes steps in figure 3 and teaches step of computer instruction used to determine the model parameters in line 7 of column 6 and further teaches steps used for solving the minimization process with steps of using the linear equations. He further teaches steps of using the Jacobian matrix processed to correspond to the measurements made at the first epoch in the upper portion and with the lower portion of the Jacobian matrix corresponding to the measurements made at the second epoch in the computation of there model in lines 50 and 5-65 of column 6.

Therefore, the prior art Kriegshauser et al., and The prior art of Chunduru et al., in combination or alone does not teach the present limitation of the claimed combination limitation.

It is these limitations expressed in each of these claims and not found, taught, or suggested in the prior art of record, that makes these claims allowable over the prior art.

Claims 19-23 which are dependent on the allowed independent claim 18 are

allowed at least for the reasons cited above.

III. The method in claim 24 for determining a formation profile surrounding a

wellbore with method steps for "receiving field log data for a formation surrounding a

wellbore" "...[and] with the steps of "determining a uniform initial conductivity vector

based on the average of the logging data apparent conductivity"...and/or in combination

with the method steps for "generating a Jacobian matrix using a sliding window and the

conductivity vector" is not found in the cited art of record.

The prior Art A of Kriegshauser et al., US 6,466,872 teaches the method of

determination of the apparent resistivity of anisotropic reservoirs using steps to apply

shoulder corrections to the measurements from a multi-component electromagnetic

logging tool, and teaches using computer processing for the anisotropic resistivity model

and teaches using the corrected data with process steps in the model iterated until a

good match is obtained between the corrected data and the model output and teaches

using the logging tool in figure 2 with the process steps in figure 4 to obtain the shoulder

bed corrections in lines 5-65 of column 3 and column 4.

The prior Art B of Chunduru et al., teaches computer modeling of the time lapse

measurements of the resistivity data acquired at different epochs and teaches using

different types of wellbore tools to process the raw induction logging data teaches steps

for processing the earth models and teaches steps for using the inversion process to

determine the bed boundaries and layers by using the processes steps in figure 3 and

teaches step of computer instruction used to determine the model parameters in line 7

of column 6 and further teaches steps used for solving the minimization process with steps of using the linear equations. He further teaches steps of using the Jacobian matrix processed to correspond to the measurements made at the first epoch in the upper portion and with the lower portion of the Jacobian matrix corresponding to the measurements made at the second epoch in the computation of there model in lines 50 and 5-65 of column 6.

Therefore, the prior art Kriegshauser et al., and The prior art of Chunduru et al., in combination or alone does not teach the present limitation of the claimed combination limitation.

It is these limitations expressed in each of these claims and not found, taught, or suggested in the prior art of record, that makes these claims allowable over the prior art.

Claims 25-29 which are dependent on the allowed independent claim 24 are allowed at least for the reasons cited above.

IV. The system in claim 30 for determining a formation profile surrounding a wellbore with the computer operable with steps for "receiving field log data for a formation surrounding a wellbore" "...[and] with the steps of "determining a uniform initial conductivity vector based on the average of the logging data apparent conductivity"...and/or in combination with the method the steps for "generating a Jacobian matrix using a sliding window and the conductivity vector" is not found in the cited art of record.

The prior Art A of Kriegshauser et al., US 6,466,872 teaches the method of determination of the apparent resistivity of anisotropic reservoirs using steps to apply

shoulder corrections to the measurements from a multi-component electromagnetic logging tool, and teaches using computer processing for the anisotropic resistivity model and teaches using the corrected data with process steps in the model iterated until a good match is obtained between the corrected data and the model output and teaches using the logging tool in figure 2 with the process steps in figure 4 to obtain the shoulder bed corrections in lines 5-65 of column 3 and column 4.

The prior Art B of Chunduru et al., teaches computer modeling of the time lapse measurements of the resistivity data acquired at different epochs and teaches using different types of wellbore tools to process the raw induction logging data teaches steps for processing the earth models and teaches steps for using the inversion process to determine the bed boundaries and layers by using the processes steps in figure 3 and teaches step of computer instruction used to determine the model parameters in line 7 of column 6 and further teaches steps used for solving the minimization process with steps of using the linear equations. He further teaches steps of using the Jacobian matrix processed to correspond to the measurements made at the first epoch in the upper portion and with the lower portion of the Jacobian matrix corresponding to the measurements made at the second epoch in the computation of there model in lines 50 and 5-65 of column 6.

Therefore, the prior art Kriegshauser et al., and The prior art of Chunduru et al., in combination or alone does not teach the present limitation of the claimed combination limitation.

It is these limitations expressed in each of these claims and not found, taught, or

suggested in the prior art of record, that makes these claims allowable over the prior art.

Claims 31-35 which are dependent on the allowed independent claim 30 are

allowed at least for the reasons cited above.

V. The system in claim 36 for the machine readable medium article of

manufacture with the storage medium storing instructions operable to cause one or

more machines to perform processing operations for determining a formation profile

surrounding a wellbore with the steps for "receiving field log data for a formation

surrounding a wellbore" "...[and] with the steps of "determining a uniform initial

conductivity vector based on the average of the logging data apparent

conductivity"...and/or in combination with the method steps for "generating a Jacobian

matrix using a sliding window and the conductivity vector" is not found in the cited art of

record. The prior Art A of Kriegshauser et al., US 6,466,872 teaches the method of

determination of the apparent resistivity of anisotropic reservoirs using steps to apply

shoulder corrections to the measurements from a multi-component electromagnetic

logging tool, and teaches using computer processing for the anisotropic resistivity model

and teaches using the corrected data with process steps in the model iterated until a

good match is obtained between the corrected data and the model output and teaches

using the logging tool in figure 2 with the process steps in figure 4 to obtain the shoulder

bed corrections in lines 5-65 of column 3 and column 4.

The prior Art B of Chunduru et al., teaches computer modeling of the time lapse

measurements of the resistivity data acquired at different epochs and teaches using

different types of wellbore tools to process the raw induction logging data teaches steps

for processing the earth models and teaches steps for using the inversion process to

determine the bed boundaries and layers by using the processes steps in figure 3 and

teaches step of computer instruction used to determine the model parameters in line 7

of column 6 and further teaches steps used for solving the minimization process with

steps of using the linear equations. He further teaches steps of using the Jacobian

matrix processed to correspond to the measurements made at the first epoch in the

upper portion and with the lower portion of the Jacobian matrix corresponding to the

measurements made at the second epoch in the computation of there model in lines 50

and 5-65 of column 6.

Therefore, the prior art Kriegshauser et al., and The prior art of Chunduru et al.,

in combination or alone does not teach the present limitation of the claimed combination

limitation.

It is these limitations expressed in each of these claims and not found, taught, or

suggested in the prior art of record, that makes these claims allowable over the prior art.

Claims 37-41 which are dependent on the allowed independent claim 36 are

allowed at least for the reasons cited above.

Conclusion

8.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Victor J. Taylor whose telephone number is 571-272-

2281. The examiner can normally be reached on 8:00 to 5:30 PM.

9.   If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, John E. Barlow can be reached on 571-272-2863. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

10.   Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

VJT

September 3, 2004.

John Barlow
Supervisory Patent Examiner
Technology Center 2800